ANALYZING THE RELATIVE NEEDS OF A SPECIAL OPERATIONS UNIT IN THE BISMARCK FIRE DEPARTMENT

STRATEGIC MANAGEMENT OF CHANGE

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ABSTRACT

The problem that initiated this research is the Bismarck Fire Department believes it has the need to establish a special operations unit. The problem is, no analysis has been conducted which could guide the strategic planning processes of a special operations unit.

The purpose of this research was to develop an analysis guide that could assist the Bismarck Fire Department in the decision-making process relative to the possible creation of a special operations unit. The action research method was utilized to conduct this research project, based upon the following questions:

1. Does the Bismarck Fire Department need a special operations unit?
2. What regulations affect the formation of a special operations unit?
3. What are the training requirements for personnel assigned to a special operations unit?
4. What have other fire departments done regarding special operations?
5. What specialized rescue functions could be placed in a special operations unit?

The procedures used to compile this research consisted of a literature review of NFPA standards, other federal standards and regulations, publications, trade magazines, an IFSTA publication, personal interviews, and surveys of fire departments throughout the United States.

The results of this research identified various types of technical rescue; relative standards, regulations, and training requirements, and the delivery of technical rescue service by other fire departments. Rationale for effectively determining the actual need

for technical rescue service was obtained. Collectively, this information was utilized to produce the analysis guide.

Recommendations were made to initiate the analysis of technical rescue needs and the subsequent special operations unit, by following the analysis guide produced from information obtained through this research. Also, the recommendation was made for continual review of incidents, demographic changes, and community growth and associated needs to assure that the proper type and level of service is maintained, or provided.

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INTRODUCTION

In October of 1998, a strategic planning retreat was held with all officers of the Bismarck Fire Department. Inconsistent delivery of specialized rescue functions was identified as needing its own strategic plan with related goals and objectives (R. Graba, personal communication, March 12, 2000).

Recently, the Bismarck Fire Department has responded to several incidents that were related to severe weather. While not severe in number of human injuries or catastrophic property loss, the risk potential was catastrophic. Annually, since July of 1993, North Dakota has received at least one federal disaster declaration because of weather related events (D. Friez, personal communication, April 14, 2000). Additionally, high-angle rescue, and hazardous material incidents have occurred within the jurisdiction served by the Bismarck Fire Department. All of these types of incidents required some form of specialized operations. Previous attempts to train various department members in areas of specialized rescue have been inconsistent. The actual delivery of specialized rescue, configured as a special operations company, would be an asset to existing engine companies. Additionally, the engine companies would be of support to the special operations companies. Establishing a special operations unit would increase our focus in specialized areas, as well as coordinate resources and specially trained personnel (D. Hopfauf, personal communications, May 17, 2000).

The coordination and subsequent implementation of a special operations unit at the Bismarck Fire Department will require leadership, both internally and externally. Conducting thorough analysis, to support the strategic planning relative to the formation of a special operations unit, will contribute to successful implementation

(J. Boespflug, personal communications, October, 1998).

Currently, either one light rescue apparatus, or aerial platform responds to support emergency operations, with the type of building actually determining which apparatus responds. Both apparatus are primarily staffed with structural firefighters who have not received training in technical rescue. In addition, the required technical rescue equipment does not exist, nor could it be placed on the small, light rescue piece of apparatus. Therefore, the Bismarck Fire Department believes it has the need to establish a special operations unit, designed to support emergencies within its jurisdiction. The problem is, no analysis has been conducted which could guide the strategic planning processes of a special operations unit.

The purpose of this applied research project is to develop an analysis guide that could assist the Bismarck Fire Department in the decision-making process relative to the possible creation of a special operations unit. The action research method was utilized to conduct this research project with a literature review, external surveys, and personal communications utilized to answer the following questions:

1. Does the Bismarck Fire Department need a special operations unit?
2. What regulations affect the formation of a special operations unit?
3. What are the training requirements for personnel assigned to a special operations unit?
4. What have other fire departments done regarding special operations?
5. What specialized rescue functions could be placed in a special operations unit?

BACKGROUND AND SIGNIFICANCE

City of Bismarck

The city of Bismarck is the capitol of the state of North Dakota. Bismarck, was established in 1873 with the arrival of the transcontinental railroad. Today, Bismarck is the center for government in North Dakota, as well as a thriving medical center. Energy, comprising of coal, oil, synthetic fuels, and related development have also contributed to the growth of Bismarck . Additional economic strengths include agriculture, and agribusiness. The city of Bismarck covers approximately 26.6 square miles. Bismarck's estimated corporate population is 56,000 and contributes to an estimated metropolitan area population of 85,000 (City of Bismarck, 1999; Schaefer, 1999).

Bismarck Fire Department

The Bismarck Fire Department currently is an all career paid department with 65 full-time fire personnel operating out of 3 structural stations and 1 airport station. Personnel consist of 1 fire chief, 1 assistant chief of operations, 1 assistant chief of support, 1 fire marshal, 1 administrative assistant, 3 battalion chiefs, 15 lieutenants, and 42 firefighters. First alarm assignment consists of a combination of 3 engine companies and 1 chief, or 2 engine companies and 1 aerial company or 1 light rescue company, and 1 chief level officer (Schaefer, 1999; J. Boespflug, personal communication, April 3, 2000).

Several attempts to establish technical rescue functions within the Bismarck Fire Department have met with less than favorable results, two examples are high-angle rope rescue and hazardous materials. Efforts with initial training were quite successful, the maintenance and delivery of these services was not possible without a means to do

so. Had these technical rescue functions been implemented based upon analytical data, success would have been more likely. Inconsistency in the delivery of these services, along with coordination of trained personnel, and availability of trained personnel, compounded the problem even further. Establishing a special operations unit will alleviate the coordination and delivery problems. Conducting a thorough needs analysis, both internally and externally, would provide data that could be utilized to strategically plan the implementation of specialized rescue functions, thereby eliminating previously experienced failures (K. Leben, personal communication, May 4, 2000).

Additionally, providing specialized rescue services, delivered through a special operations unit, would allow these special operations' personnel to prepare for various types of incidents through review, pre-incident planning, and training based upon specific sites and potential emergencies. These personnel and equipment would be available and present on all incidents either performing their role or supporting engine and ladder company operations (D. Hopfauf, personal communication, May 17, 2000; K. Leben, personal communication, May 16, 2000; D. Peterson, personal communication, May 15, 2000)

Research and Significance

This research paper was prepared to satisfy the applied research requirements of the *Strategic Management of Change* (SMOC) course within the Executive Fire Officer Program at the National Fire Academy (NFA). SMOC specifically deals with the use of the change management model (CMM) to provide the senior level fire officer the knowledge, skills, and ability to adapt to the ever changing delivery of emergency services. The CMM utilizes a systematic progression of behaviors that can assist senior

fire officers who must facilitate rapid changes in the delivery of emergency services. The CMM is a tool that provides direction for managing change a senior officer must accomplish, as well as managing the opportunities available from change. The CMM helps bring about effective change through a systematic, four-phase process: analysis, planning, implementation, and evaluation/institutionalization (NFA, 1996, p. SM 2-3).

Specifically, this research relates to the analysis, or first phase of the CMM presented in module two of SMOC (see Appendix A). The analysis phase of change management is further described as:

> The first phase in the change management model involves analyzing the existing situation and assessing what changes need to be made. The Analysis Phase is an overall needs assessment performed to identify the influences creating the need for change. Through this identification, the overall magnitude of change required is determined and specific organizational change requirements are defined. (NFA, 1996, p. SM 2-3).

The results of this research are of great significance to the Bismarck Fire Department since no analysis has been conducted pertaining to the creation and development of a special operations unit. This research provides the leadership of the Bismarck Fire Department with an analysis guide which will assist the strategic decision making process by consistent collection of pertinent data. Additionally, with considerable dedication and organizational change necessary to create and develop a special operations unit, the use of an analysis guide will contribute to its safe, efficient, and effective implementation. This research may also help other fire departments make decisions by providing a method to obtain analytical data which could be utilized in their strategic planning process.

LITERATURE REVIEW

The literature review began with a review of National Fire Protection Association (NFPA) standards that pertained to fire personnel and technical rescue. The literature review also involved technical rescue publications, fire service trade magazines, Occupational Safety and Health Administration's (OSHA) confined space regulation, and the National Institute for Occupational Safety and Health's (NIOSH). Two contracted technical rescue publications from the United States Fire Administration (USFA) were reviewed. Additionally, review of the International Fire Service Training Association (IFSTA) *Fire Service Rescue* publication occurred. Materials utilized in the literature review were obtained from the Learning Resource Center at the National Fire Academy, the library at the Bismarck Fire Department, and the author's personal library.

NFPA Standard Number 1001, Standard for Fire Fighter Professional Qualifications (1997), provided the job performance requirements for a firefighter operating with a special rescue team. Firefighters are expected to be able to assist rescue teams by understanding given tasks; they must understand and follow standard operating procedures, effectively utilize special rescue equipment, and complete their assignment. Prerequisite knowledge requires firefighters to know their role at special rescue incidents, associated hazards, special rescue tools and their use, along with rescue goals and procedures. Prerequisite skills require a firefighter to be able to identify and retrieve assorted rescue tools, establish barriers to protect the public, as well as assist the rescue team as a member when assigned.

NFPA Standard Number 1001 influenced this research paper by providing required knowledge and skills of firefighters during special rescue operations. These knowledge and skills, while general in nature, provide critical support to a special rescue

team and assistance as a member when necessary. The knowledge and skill requirements of a firefighter found in NFPA 1001 (1997), provides a special rescue team the ability to become modular and expand as necessary to control a specialized rescue incident.

IFSTA (1996) *Fire Service Rescue* which reflects NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, stated the "scope of this manual is limited to those situations to which most firefighters and rescue squad members may be called. Some situations and environments, such as wilderness search/rescue and underwater search/rescue have been omitted because they are beyond the range and responsibility for most fire departments" (p.1).

IFSTA (1996) stated that a fire department "should assess the potential for rescue situations occurring within its district and then evaluate the capabilities of the department for handling these types of rescues" (p. 5). IFSTA (1996) further defined the assessment process, both internally and externally, as well as discussing various organizations and agencies that may be of assistance to a rescue service.

IFSTA influenced this research by the reflection of NFPA Standard 1001 as well as the collective knowledge and experiences the validation committee contributed to *Fire Service Rescue*. This manual will be of benefit during, and after, the analysis phase of special operations at the Bismarck Fire Department.

NFPA Standard Number 1006, Standard for Rescue Technician Professional Qualifications (2000), established the minimum performance requirements for emergency personnel at technical rescue incidents. NFPA 1006 (2000), revealed the general requirement of operating within applicable safety standards. These standards

include those developed nationally, regionally, through a state, and locally. Due to the inherent dangers associated with technical rescue, operating in a safe manner, with proper knowledge and adherence to safety standards, is of utmost importance.

NFPA 1006 (2000) further revealed the minimum general requirements of a rescue technician to effectively size up a rescue incident, determine necessary resources and equipment, track these resources, and commence rescue operations. These requisite knowledge and skills allow a rescue technician to perform in strategic or tactical areas of a rescue incident, including patient care, and conclude with demobilization of the rescue incident. Additionally, a rescue technician shall be able to conduct the related maintenance on equipment, including personal protective gear, and maintain the necessary records. In addition to these general requirements, a rescue technician shall also be able to perform all of the requirements of one of the following specialty rescues; rope rescue, surface water rescue, vehicle and machinery rescue, confined space rescue, structural collapse rescue, or trench rescue.

NFPA 1006 (2000) influenced this research by providing specific descriptions of the required knowledge and skills a rescue technician must be able to perform, in general. Also, the descriptions, and specific knowledge and skill requirements for several types of specialized rescues, provided the ability to separate technical rescue into various parts which can be individually analyzed.

NFPA Standard Number 1670, Standard of Operations and Training for Technical Rescue Incidents (1999), centers around the safe and effective operations conducted at technical rescue incidents. The Authority Having Jurisdiction (AHJ) shall establish levels of operation. These levels are further explained as:

> *(a) Awareness*. This level represents the minimum capability of a responder who, in the course of his or her regular job duties, could be called upon to , or could be the first on the scene of, a technical rescue incident. This level can involve search, rescue, and recovery operations. Members of a team at this level are generally not considered rescuers.
>
> *(b) Operations*. This level represents the capability of hazard recognition, equipment use, and techniques necessary to safely and effectively support and participate in a technical rescue incident. This level can involve search, rescue, and recovery operations, but usually operations are carried out under the supervision of technician-level personnel.
>
> *(c) Technician*. This level represents the capability of hazard recognition, equipment use, and techniques necessary to safely and effectively coordinate, perform, and supervise a technical rescue incident. This level can involve search, rescue, and recovery operations. (Chapter 2-1.2)

NFPA 1670 (1999) provides a separate chapter for each of the following types of technical rescue; structural collapse, rope rescue, confined space, vehicle and machinery, water, wilderness search and rescue, and trench and excavation. The specific requisites for each level of technical rescue, awareness, operations, and technician, are contained in each chapter also. Additionally, reference was made, to NFPA 472, *Standard for Professional Competence of Responders to Hazardous Materials Incidents*, throughout the various types of rescues and the relative levels of each.

Sargent (1999) expanded on NFPA 1670, *Standard of Operations and Training*

for Technical Rescue Incidents. Sargent stated NFPA 1670 includes the "old NFPA 1470, *Standard on Structural Collapse Training and Operations*." (p. 84). Also, NFPA 1670 "aligns itself operationally with the current OSHA, ANSI, and other national laws" (p. 84).

Sargent (1999) went on to state that NFPA identifies seven specific types of technical rescue; structural collapse; rope rescue; confined space; vehicle and machinery; water rescue – ice, swift water, surf, and dive; wilderness search and rescue, and trench rescue. These technical rescue disciplines are comprised of the operational levels of awareness, operations, and technician. The associated knowledge, skills, and abilities (KSAs) of each operational level are specifically spelled out in NFPA 1670. This is further explained:

> Finally, people from the East Coast, West Coast, and Midwest can talk about levels of service based on KSAs instead of program names and descriptions. For example, programs such as Rescue Systems 1 and 2 (RS-1 and 2), Basic Emergency Rescue Technician (BERT), Emergency Response Technician (ERT), and Heavy and Tactical Rescue (HRT) may be evaluated based entirely on how they address each level of service based on KSAs, not the program name. This allows for standard-specific curriculums that mirror each other and ultimately provide the same level of KSAs for participants (p. 84).

Sargent (1999) also explained the general requirement that all members must be trained to the awareness level of each technical rescue discipline a jurisdiction intends to provide. Other general requirements include:

> Organizations must conduct a hazard and risk assessment of their response area to determine the feasibility of conducting technical rescue operations. This includes identifying potential hazards and their likelihood to cause a technical rescue incident. This process must be documented, reviewed, and updated on a scheduled basis. The hazard analysis requires:
>
> 1. A review of factors influencing the scope and frequency of events.
> 2. The identification of internal resources.
> 3. The identification of external resources.
> 4. Procedures to acquire those resources.
>
> Jurisdictions must develop a process for incident response planning. This should be a formal written special operations plan and must be distributed to personnel and agencies with responsibilities in the plan (p. 89).

Additionally, Sargent (1999) provided that organizations must assure adequate types of equipment exist; personnel have the appropriate personal protective equipment; and the incident management system, along with a safety officer, is utilized at incidents. Sargent further added:

> During a risk and hazard assessment, an organization may discover that it has only frame and masonry structures in its response area. When all other factors are taken into account, the organization may decide that it need train only to the Operations Level for Structural Collapse to provide the necessary level of service. Certainly, it will need to train personnel to the Technician level in certain areas, but resource allocation decisions can

be rationally made based on evaluation rather than just a gut feeling (p. 89).

Sargent influenced this research by further explaining and expanding upon NFPA 1670. Sargent and NFPA 1670 further influenced this research by providing a strong foundation for development of an analysis guide, which is the intent of this research.

NFPA Standard Number 472, Standard on Professional Competencies of Responders to Hazardous Materials Incidents (1997), also describes established levels of operation. These levels are also titled awareness, operations, and technician. The content of these levels mirror those of NFPA 1670, only utilizing hazardous materials terminologies instead of technical rescue.

NFPA 472 (1997) further specifies that each level of operation shall be trained to the specific levels of training contained within this standard. Additionally, each level shall receive training to meet the requirements of the Environmental Protection Agency (EPA), Department of Transportation (DOT), and the Occupational Safety and Health Administration (OSHA).

NFPA Standards 1670 (1999) and 472 (1997) influenced this research by describing the three levels of operational response and the related competencies of each. Also, NFPA 472 referenced additional training requirements of various United States regulatory agencies.

OSHA, revealed within their confined space standard *29 CFR1910.146* (1993), that an employer shall evaluate a designated rescue or emergency service's ability to respond in a reasonable period of time to a confined space emergency. Additionally, the employer shall evaluate the potential rescue service's ability to perform the actual

rescue of victims from a confined space emergency. This evaluation is to include the equipment, proficiency, and ability to rescue victims from the various types of hazards present at the site the confined space exists.

OSHA (1993), further provided that the employer of the employees designated to conduct the confined space rescue, shall provide personal protective equipment, ensure successful completion of required training, review areas of potential rescue needs, and conduct at least one simulated rescue every twelve months. In addition to the annual training of all employees involved in confined space rescue at least one employee, present during a confined space operations, shall be trained in basic first aid and cardiopulmonary resuscitation (CPR).

NIOSH (2000), revealed it, in itself, does not produce regulations or standards pertaining to technical rescue, including the area of confined spaces. NIOSH, does however conduct the research for regulations and standards that are enforced by OSHA.

OSHA and NIOSH influenced this research by providing information pertaining to the process of developing standards or regulations. NIOSH conducts the research and OSHA develops the related standard or regulation, consistency and thoroughness should be expected.

Jakubowski (2000) wrote about the Southampton Fire Company Number 1 conducting an evaluation of their specialized rescue operations. During internally analysis of existing capabilities, it was discovered that several members had become specialized in various types of specialized rescue, however, necessary training and related equipment was unavailable. Externally, analysis identified a definite need for

additional types of specialized rescue that was currently unavailable from their department or mutual-aid from surrounding jurisdictions.

Southampton's rescue specialists would need to train 40 hours per year in collapse rescue, beyond the weekly training currently performed. Team training centered around the National Fire Academy's *Rescue Systems I*, modified to suit Southampton's needs. Today, Southampton's specialized rescue team provides other organizations with experiences, knowledge, and skills, while continuing to increase their own knowledge, skills, and abilities (Jakubowski, 2000).

Jakubowski influenced this research by providing similarities to the situation the Bismarck Fire Department is in regarding technical rescue. Additionally, the results of a coordinated effort, based upon internal and external analysis, appears to have provided a dedicated specialized rescue team, and subsequent service, to the customers within Southampton's jurisdiction.

Naum (1997) in his writing of the *Rescue Operations* chapter in NFPA's *Fire Protection Handbook* stated "rescue emergency services system involves more than basic structural fire rescue and extrication capabilities; it extends into other areas that impact incident response capabilities. Specialized technical rescue response teams have evolved as traditional and typical functional areas are transcended" (p.10-131)

Naum (1997) further stated:

> Specialized technical rescue response capabilities are recognized as a tactical component in the emergency response delivery system. In many instances, the need for specialized technical rescue capabilities has slowly developed due to identified community risk factors in incident responses

> or through specific incident occurrences that have shown the deficiencies that were present within the response system (p. 10-131)

Naum (1997) provided several types of specialized technical rescue response. These areas were, but are not limited to; high and low angle rope rescue, motor vehicle extrication, industrial extrication, confined-space rescue, trench rescue, below-grade rescue, building collapse rescue, surface and underwater and swift-water rescues, ice rescue, wilderness search and rescue, urban search and rescue, agricultural and farm rescue, hazardous materials rescue, high-rise rescue, helicopter rescue; heavy rescue from air, rail and maritime, and large-scale disaster rescue.

Naum (1997) described the need and development of a specialized rescue team. The need for a specialized rescue team is based upon historical trends of a community or jurisdiction along with the strengths and weaknesses of the emergency service. These areas are combined with the potential risk that currently exists. Local conditions and perspectives determine what the level of acceptable risk is and how it is balanced with the current abilities of the existing emergency service delivery system.

Naum (1997) further explained:

> Rescue deployment and operations ability is based upon the degree of awareness, knowledge, training, resources, and planning that are present, coupled with the potential, frequency, magnitude, and impact that these factors may have on the specialized agency's ability to carry out the necessary functions dictated by the incident response. The development of a specialized technical rescue component within any jurisdiction requires a thorough understanding of the inherent hazard potential present

> at specific technical rescue responses; the degree of commitment required in the way of financial support, training, and skill enhancement; resource allocation and equipment requirements; and logistical planning and legal ramifications that will impact the conceptualization, implementation, and ultimate operation of a specialized rescue team (p. 10-131).

Naum mentioned several regulations or standards that must be complied with, or their intent met. Some of these were: NFPA, OSHA, American National Standards Institute (ANSI), NIOSH, DOT, United States Department of Labor (DOL), National Association for Search and Rescue (NASAR), and others (p.10-134). Additionally, Naum recommended the most recent version of the following NFPA codes, standards, and recommended practices: NFPA 220, *Types of Building Construction*; NFPA 1001, *Standard for Fire Fighter Professional Qualifications*; NFPA 1201, *Developing Fire Protection Services for the Public*; NFPA 1470, *Standard on Search and Rescue Training for Structural Collapse Incidents*; NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*; NFPA 1521, *Fire Department Safety Officer*; NFPA 1561, *Fire Department Incident Management System*; NFPA 1600, *Disaster Management*; NFPA 1983, *Fire Service Life Safety Rope & System Components* (p. 10-136).

Naum (1997) gave examples of technical rescue training programs, and the time necessary to complete various levels of operational response. Awareness level rope rescue took one day, operations level took two days, and technician level took approximately one week. Confined space rescue took a few hours for awareness level training, operations level training was several days, and technician level took forty to

sixty hours. Structural collapse rescue required eight to twelve hours of awareness level training, five to eight days for operations level training, and five to seven days for technician level training. Water rescue requires a few hours for awareness level training, operations level training requires that personnel can swim and takes approximately one week, while technician level training takes one week and requires special rescue techniques such as victim removal with boats or helicopters. “Dive rescue is a specialty within itself” (p.10-136). Naum (1997) went on to state that certain types of rescue share equipment, skills, and techniques. These rescues were identified as trench rescue, building collapse, and confined space rescue.

Naum influenced this research by the shear knowledge, and direction, offered through his writings in the *Fire Protection Handbook.* Additionally, Naum also brought to light the need for analyzing internal and external strengths and weaknesses, the necessary training, need to evaluate risk potentials, and associated regulation and standards that affect the areas of specialized rescues.

Peters (1991) provided insight into the startup of a diverse rescue service experienced by the Jersey City, New Jersey, Fire Department. Peters defined the mission of their rescue company as being able to accomplish; fire search and rescue; assist ventilation; assistance with non-routine forcible entry; auto extrication; industrial accident rescue; heavy lifting; masonry forcible entry; metal-cutting; air monitoring; emergency medical services; infrared capabilities; mass casualty incidents; electrical power supply; water rescue; communications; confined space rescue; trench rescue; and hazardous materials team assistance (p. 18).

Peters (1991) further provided information regarding how personnel were

selected to be members of their rescue company. Members were required to submit a letter and resume depicting prior relative training and experience. Peters added, “We were looking for candidates with an excellent firefighting record, a good attitude, and a willingness to learn” (p. 21).

Additionally, Peters added the following steps on forming a rescue company:

1. Identify local hazards that will be addressed by the formation of a rescue company.
2. Define mission and objectives that will be performed by the unit.
3. Create a list of tools that will be needed to accomplish these goals.
4. Research the types of apparatus that will suit your needs, considering size, weight, personnel-riding capacity, and estimated price.
5. Request funding by presenting a comprehensive plan that stresses economy and efficiency.
6. Finalize your specifications based on your needs and available funding.
7. Determine manpower levels and select personnel based on qualifications. Outline a temporary replacement policy.
8. Begin specialized training in advance of the anticipated arrival of the apparatus. If the size of the department warrants, appoint a rescue coordinator to supervise.
9. Establish the response criteria for the unit.
10. Once the unit is operating, make provisions for a backup or reserve apparatus if possible (p. 22).

Peters influenced this research by offering experience and insight into the initial

analysis of a rescue company, and the mission of such. The mission of the rescue company clearly led to further needs assessment, including personnel that would help with the formation of such a unit.

Wright (1993) wrote about the Guilford County Department of emergency Services' path of special operations beginning with a fuel spill team in the 1970s to a technician level hazardous materials team by 1990. In 1984, the Guilford County Association of Scuba Personnel (GASP) was formed after an unsuccessful underwater rescue attempt from a submerged vehicle occurred. Since the implementation of GASP, a search and rescue function has been added for lost and missing people emergencies. Wright states, "other possibilities for special teams include technical rope rescue, trench rescue, and urban search and rescue" (p. 91) Wright also adds that providing technical rescue services, an incident commander can utilize these services to deal more effectively with the non-routine incidents.

Wright (1993), added that training has occurred from the Emergency Response Institute and the National Association for Search and Rescue. Further development occurs through joint training with surrounding states and the North Carolina Department of Emergency Management. Wright further states, emergency response is not a game, "it does have to be accomplished with strict conformity to standards, using defined and practiced levels of skill and competence" (p. 91).

Wright influenced this research by writing about how a department built their technical rescue services based upon determined needs, and the training resources they utilize to maintain the competencies required to safely and effectively deliver these services. Also, the benefits of having these technical rescue services available to an

incident commander as a tool to deal with non-routine incidents more effectively. USFA (1995) *Technical Rescue Technology Assessment* compiled experiences and knowledge of rescue organizations, fire departments, and people involved in technical rescue services, equipment manufacturers, and experts in technical rescue.

USFA (1995) stated “Fire departments across the country have assumed a major role as primary responders to rescue incidents that involve, among other things, structural collapse, trench cave-in, confined spaces, industrial and agricultural machinery, water emergencies, and persons trapped above or below grade level.” (p. i) “To deal with these complicated rescue operations, many fire departments have created special technical rescue teams” (p. i).

Technical Rescue Technology Assessment is composed of three sections designed to help departments assess the needs, current abilities, and ways to improve the delivery of technical rescue service (USFA, 1995).

USFA (1996) *Technical Rescue Program Development Manual* provides direction on the formation of technical rescue team. Specifically, this manual discusses several questions relating to the formation of such a function. These questions are:

- Do we need a team for our community?
- What type of team does our community need?
- How do we conduct a risk assessment to identify rescue hazards?
- How do we start a team?
- What training is necessary for team members?
- What dangers are involved in technical rescue?
- How can we fund the team?

- What type of personnel will we need on the team?
- What laws and standards pertain to rescue?
- What equipment will the team need? (p. i)

Technical Rescue Technology Assessment and *Technical Rescue Program Development Manual* both influenced this research by providing documents that compile experiences and direction for establishing technical rescue response. Resources, processes, needs, and capabilities are thoroughly explained. The intent of this research is to provide an analysis guide which these publications will compliment. Additionally, these publications will be of value to both planning and implementation of a special operations unit.

PROCEDURES

The literature review began with a review of materials at the Learning Resource Center (LRC) at the National Fire Academy, Emmitsburg, Maryland in January, 2000. This was followed up with a reference request from the LRC during February, 2000. Also, the author's personal library and the Bismarck Fire Department's library were utilized from February, 2000 through June, 2000.

The literature review consisted of materials that identified, and explained, technical rescue and several related standards and regulations, especially NFPA standards. Additionally, training publications and trade magazines were reviewed.

Personal Interviews were conducted with Joel Boespflug, Fire Chief with the Bismarck Fire Department, in October, 1998 and April, 2000; Doug Friez, Director of North Dakota Emergency Management; Rick Graba, a Fire Lieutenant with the Bismarck Fire Department in April, 2000; Darol Hopfauf, a Fire Battalion Chief with the

Bismarck Fire Department, in May, 2000; Kurt Leben, a Fire Battalion Chief with the Bismarck Fire Department, in May, 2000; and Don Peterson, a Fire Battalion Chief with the Bismarck Fire Department, in May, 2000.

A random survey was conducted during April 2000 of a small number of local fire departments within the state of North Dakota and the author's fire service colleagues throughout the United States. Collectively, forty surveys were sent. In addition to North Dakota, surveys entered the states of California, Colorado, Florida, Hawaii, Louisiana, Maryland, Massachusetts, Missouri, Nebraska, Nevada, New Mexico, North Carolina, Ohio, Pennsylvania, Utah, Vermont, Virginia, Washington, and Wisconsin. The survey requested information pertaining to the experiences other fire departments have had with technical rescue and special operations units (see Appendix B).

This research document, including the survey and appendices, was produced using Microsoft *Word*. The contents of the analysis guide was obtained through this research project.

The author's spouse and fire service colleagues assisted with advice and recommendations relating to this research paper.

Assumptions

The author made the assumption that the random survey sent to fire service colleagues throughout the United States, including North Dakota, would produce a large enough gathering of knowledge and experience pertaining to the intent of this research project. This assumption was made because the author felt types of building construction and occupancies and their inherent risks, and other risks determine a jurisdictions potential need for specialized rescues, not the type or size of a fire department.

Limitations

This research project was limited by several factors, one being the fact that technical rescue would be an expensive service to provide requiring extensive analysis beyond what this research provides, or even suggests. Training, both initial certification and continuing, would require analysis and research to provide the necessary details for effective strategic planning.

This research project was required to be completed and submitted within six months from the end of the *Strategic Management of Change* course at the National Fire Academy, Emmitsburg, Maryland.

Additionally, this research paper dealt specifically with the division of the department to which the author is accountable. Therefore, the building inspection and environmental health divisions of the department were not discussed or referred to anywhere other than the Background & Significance section of this paper. Also, the department will be referred to as the Bismarck Fire Department, not the Bismarck Fire and Inspections Department (Schaefer, 1999).

The surveys were sent to a relatively small group of fire departments throughout the United States, including North Dakota, and fire service colleagues. Collectively forty surveys were sent. These surveys were constructed to obtain information, experiences, and possibly recommendations, rather than statistical data. Additionally, the survey tool was designed by the author whose related experience is quite limited.

Definition of Terms

American National Standards Institute (ANSI). A private non-profit membership organization of private and public organizations that facilitates the development of

standards through a consensus.

Change Management Model (CMM). The change management model utilizes a systematic progression of behaviors that can assist senior fire officers who must facilitate rapid changes in the delivery of emergency services. The CMM is a tool that provides direction for managing change a senior officer must accomplish, as well as managing the opportunities available from change. The CMM helps bring about effective change through a systematic, four-phase process: analysis, planning, implementation, and evaluation/institutionalization (NFA, 1996, SM 2-3).

Executive Fire Officer Program (EFOP). The EFOP is a program of the National Fire Academy designed to provide, and improve, a senior fire officer's professional, administrative development. This development occurs through completion of four unique graduate and upper-level college equivalent courses. The EFOP covers a four year program, with three required courses, and one elective course chosen by the student. Courses are all two weeks in length, with a required applied research project to be completed within six months of course completion (NFA, 2000-2001, p. 17).

National Association for Search and Rescue (NASAR). A self-supporting membership organization dedicated to improve search and rescue through professional, literary and scientific knowledge and training in the areas of search and rescue.

National Fire Protection Association (NFPA). An international, non-profit organization that develops scientifically based consensus codes and standards, research, training, and education relative to fire and other hazards.

National Institute for Occupational Safety and Health (NIOSH). Established by Congress in 1970. NIOSH is part of the Centers for Disease Control and Prevention and

is the only federal institute responsible for research and recommendations to improve work place safety and health.

Occupational Safety and Health Administration (OSHA). Established by Congress in 1970, as part of the United States Department of Labor. OSHA's role is to develop standards to improve work place safety and health.

Special operations unit. A team of fire personnel trained to respond to specific technical rescue emergencies. Usually, special operations units are supported by apparatus that contain specialized tools and equipment.

Strategic Management of Change (SMOC). One, of several, Executive Fire Officer Program courses. SMOC specifically deals with the use of the change management model to provide the senior level fire officer the knowledge, skills, and ability to adapt to the every changing delivery of emergency services (NFA, 2000-2001, p. 22).

RESULTS

1. Does the Bismarck Fire Department need a special operations unit?

The literature review did not produce anything specifically stating that a special operation unit or technical rescue service is required by a fire department. Personal interviews that were conducted with the Bismarck Fire Department personnel (Graba, Hopfauf, Leben, and Peterson) did indicate a history of incidents that would fall underneath various technical rescue disciplines. Also, the personal interviews did indicate a consistent problem of maintaining the required training and subsequent efficiencies in various technical rescue disciplines that have been attempted.

Several personal interviews were paralleled by Wright (1993) who wrote about ineffective operations during incidents and benefit a jurisdiction provides when an

incident commander can utilize technical rescue services to deal more effectively with the non-routine incidents.

To further determine a jurisdiction's need for a special operations unit, IFSTA (1996), NFPA 1670, and several authors (Jakubowski, 2000; Naum, 1997; Peters, 1991; and Sargent, 1999) provided direction in making such a determination. The basis centers around the determination of a jurisdiction's technical rescue needs through historic reviews of incident types and potential risk assessments. Additionally, proper documentation, inventory of internal and external resources, and continual review will further contribute to successful accomplishment of technical rescue service. Furthermore, conducting these reviews and assessments, would provide the analytical data which can substantiate the need for specific types, and levels, of technical rescue service. IFSTA (1996) added the importance of a fire department assessing the potential risk within its jurisdiction to determine technical rescue needs, and further stated that wilderness search/rescue and underwater search/rescue "are beyond the range and responsibility for most fire departments" (p.1).

To provide further assistance in determining both the need for, and the formation of, a special operations unit, USFA's *Technical Rescue Technology Assessment* and *Technical Rescue Program Development Manual*, can be of assistance. Combined, these manuals offer insight on assessing current needs, current abilities, and ways to improve the delivery of an existing technical rescue service; and the formation and maintenance of a new technical rescue unit. (USFA, 1995).

2. What regulations affect the formation of a special operations unit?

The literature review produced several standards and regulations that affect the delivery of technical rescue service. Naum (1997) provided an extensive list which included: NFPA, OSHA, American National Standards Institute (ANSI), NIOSH, DOT, United States Department of Labor (DOL), National Association for Search and Rescue (NASAR), NFPA 220, *Types of Building Construction*; NFPA 1001, *Standard for Fire Fighter Professional Qualifications*; NFPA 1201, *Developing Fire Protection Services for the Public*; NFPA 1470, *Standard on Search and Rescue Training for Structural Collapse Incidents*; NFPA 1500*, Standard on Fire Department Occupational Safety and Health Program*; NFPA 1521, *Fire Department Safety Officer*; NFPA 1561, *Fire Department Incident Management System*; NFPA 1600, *Disaster Management*; and NFPA 1983, *Fire Service Life Safety Rope & System Components*.

Since the writing of Naum in the Fire Protection Handbook, NFPA 1006, *Standard for Rescue Technician Professional Qualifications* (2000) and NFPA 1670, *Standard of Operations and Training for Technical Rescue Incidents* (1999) have been published. NFPA (2000) details the minimum performance requirements of personnel at technical rescue emergencies. NFPA (1999) details the safe and effective operations at technical rescue emergencies. Together, these two standards provide a sound basis for establishing a technical rescue unit.

Also, all applicable state and local laws, regulations, and standards must be reviewed.

3. What are the training requirements for personnel assigned to a special operations unit?

Training for special operations unit assignment starts with basic firefighter training. NFPA 1001, revealed a firefighter is expected to be able assist rescue teams with assigned tasks, ability to follow standard operating procedures, and effectively utilize special rescue equipment to complete assignments. Additionally, a firefighter must know their role at special rescue incidents. Knowledge of associated hazards, special rescue tools and their use, along with rescue goals and procedures are crucial to the success of a rescue and the rescue team. These knowledge and skills, while general in nature, provide critical support to a special rescue team.

NFPA 1006, established the minimum performance requirements for emergency personnel at technical rescue incidents. Included are the general requirements of operating within applicable safety standards developed nationally, regionally, through a state, and locally. Due to the inherent dangers associated with technical rescue, operating in a safe manner, with proper knowledge and adherence to safety standards, is of utmost importance. NFPA 1006 further revealed, the minimum general requirements of a rescue technician to effectively size up a rescue incident, determine necessary resources and equipment, track these resources, and commence rescue operations. These requisite knowledge and skills allow a rescue technician to perform in strategic or tactical areas of a rescue incident, including patient care, and conclude with demobilization of the rescue incident. Additionally, a rescue technician shall be able to conduct the related maintenance on equipment, including personal protective gear, and maintain the necessary records.

NFPA 1670 centers around safe and effective operations conducted at technical rescue incidents. This is accomplished by clearly establishing and defining levels of

operation, which are *Awareness*, *Operations*, and *Technician*. NFPA 472 describes established levels of operation at hazardous material incidents which are also titled *Awareness, Operations,* and *Technician.* Additional training regulations that are to be met from both the EPA and DOT are discussed in NFPA 472.

OSHA (1993) provided employer requirements, for both the rescue service and the personnel working within a confined space. OSHA requires both employers to assure that employees entering a confined space are protected with proper equipment and provided with rescue service itself. Additionally, OSHA requires the employer of the employees designated to conduct the confined space rescue to ensure successful completion of required training, review areas of potential rescue needs, and conduct at least one simulated rescue every 12 months. In addition to the annual training of all employees involved in confined space rescue at least one employee, present during a confined space operations, shall be trained in basic first aid and CPR.

Sargent (1999) further expanded on NFPA 1670. One specific training requirement mentioned was the fact that every member will be trained to a minimum of *Awareness* level of every technical rescue discipline delivered by a jurisdiction. Additionally, the risk and hazard assessment of a jurisdiction, the organization will discover what level of operation (*Awareness*, *Operations*, or *Technician)* is necessary. This, combined with NFPA 1670 requirement that the AHJ shall determine what levels of operation will be provided, will ultimately determine the training requirements, and needs. Sargent went on to state that organizations must assure personnel have appropriate knowledge of, and utilize an incident command system, along with a safety officer, at all incidents.

USFA (1996) *Technical Rescue Program Development Manual* provides an in-depth look at training requirements for various technical rescue disciplines. Additionally, recommendations on the development of technical rescue training, along with external sources of training, are provided. Further discussion of OSHA regulations are provided, which will impact an organization's technical rescue training requirements.

Survey results indicate other fire departments do follow federal, state, and local regulations and standards for training requirements. NFPA standards appear to be the basis for most training. Jurisdictions with existing technical rescue service are willing to help others get started, and in some cases actually provide training to others.

4. What have other fire departments done regarding special operations?

Survey results indicate technical rescue functions place within a special operations unit are specific to each jurisdiction. Specifically, jurisdictions implemented technical rescue services because of an immediate need experienced during an emergency, or as a proactive step towards preparing for disasters or large-scale emergencies, based upon their risk potential.

Survey results also indicated that varying combinations, and modifications, were made to technical rescue disciplines. This included technical rescue needs unique to a jurisdiction's geography, industrial or commercial makeup, or citizen beliefs. Some special operations units were created through mutual-aid or regional technical rescue service for large scale disasters while others were for industry specific rescue needs. Combined, local needs determined the initial formation and subsequent technical rescue services provided by special operations units.

Additionally, survey results consistently indicated funding, and internal and

external support of technical rescue functions as being crucial to the overall effectiveness, and existence, of special operations units.

5. What specialized rescue functions could be placed in a special operations unit?

The literature review of NFPA standards indicated levels of operation for various types of technical services. Specifically, NFPA 1670 provides levels of function for: structural collapse, rope rescue, confined space, vehicle and machinery extrication, water, wilderness search and rescue, and trench and excavation rescue, and NFPA (1997) discusses levels of operation at hazardous materials incidents.

Collectively, several authors (Naum, 1997; Peters, 1991; Sargent, 1999;) described other types of technical rescue disciplines such as, water rescue divided into ice, swift water, surf, or dive rescues; industrial extrication, urban search and rescue, agricultural and farm rescue, hazardous materials rescue, high-rise rescue, helicopter rescue; heavy rescue from air, rail and maritime, large-scale disaster rescue, heavy lifting; masonry forcible entry; metal-cutting; air monitoring; emergency medical services; infrared capabilities; mass casualty incidents; electrical power supply; communications; and hazardous materials team assistance to the list of possible types of technical rescue.

In addition, surveys results provided additional types of technical rescue disciplines that included bomb squad related, ice, rapid intervention team, civil disturbance, wilderness or mountain search and rescue, subway response, foam operations, terrorism response, critical incident stress debriefing, mine shaft rescue, and earthquake related disasters. Survey results consistently referenced hazardous

materials as a special operations function. These services were provided through varying degrees of mutual-aid, local response, or regional response.

DISCUSSION

Research results did not produce any specific requirement of a fire department to provide technical rescue service. It is however quite normal, and often times expected, that the fire service is the organization that provides technical rescue service.

Personal interviews as well as work from several authors (Jakubowski, 2000; Naum, 1997; Peters, 1991; and Wright, 1993) indicated similar driving forces that identified a need for technical rescue service. Successful implementation of a technical rescue service is the basic difference between the writings of the referenced authors, and that of the Bismarck Fire Department. Similarities are identical in that, all experienced needs from various incidents that were beyond that of each jurisdiction's normal emergency response.

The levels of technical rescue service are generally decided by local needs, historic incident data, risk potential, and related standards and regulations. Properly trained personnel, and equipment available to conduct the necessary technical rescue, will determine the depth of involvement of both personnel and jurisdiction. Three levels of operation exist, *Awareness*, *Operations*, and *Technical*. Within these levels lie the knowledge, skills, and abilities a fire department, or technical rescue service, must possess. NFPA 1006, *Standard for Rescue Technician Professional Qualifications* (2000) provides the details necessary for rescuer performance. NFPA 1670, *Standard for Rescue Technician Professional Qualifications* (1999) and NFPA 472, *Standard on Professional Competencies of Responders to Hazardous Materials Incidents* (1997)

provide the competency requirements for each level of operation, including safe and effective performance at technical rescue incidents.

While NFPA 1001, *Standard for Firefighter Professional Qualifications* (1997) states firefighters are expected to assist rescue teams. Sargent (1999) added, an NFPA 1670 requirement, that every member of a jurisdiction shall be trained to at least the *Awareness* level of any technical rescue discipline delivered by that jurisdiction. Together, these requirements form the basis for technical rescue and contribute to safe and successful operations during emergencies.

NFPA 1670 and several authors (Jakubowski, 2000; Naum, 1997; Peters, 1991; Sargent, 1999; and Wright, 1993) all described various technical rescue disciplines. Variations from NFPA 1670 technical rescue disciplines were either modified to fit a specific region or jurisdiction, or were created in preparation of potential disaster. Still, all modifications, or services, appeared to simply be variations of the disciplines represented in NFPA 1670.

Most technical rescue disciplines require their own specific training, however Naum (1997) offered that certain types of technical rescue actually share the same equipment, skills, and techniques such as trench rescue, building rescue, and confined space rescue. Careful analysis should identify key characteristics of certain technical rescue disciplines that may produce similar compatibilities. In addition, while conducting its own analysis, the Bismarck Fire Department may find like similarities in addition to the need to modify a discipline to compensate for harsh weather.

The training and related operational standards and regulations for technical rescue are quite extensive. Naum (1997) referenced several standards and regulations

in *Fire Protection Handbook* such as ANSI, DOT, DOL, NASAR, and the most recent version of the following NFPA codes, standards, and recommended practices: NFPA 220, 1001, 1201, 1470, 1500, 1521, 1561, 1600, and 1983. Additionally, OSHA and NIOSH work together to produce standards and NFPA 472 specifically relates to hazardous materials, identified by some as a technical rescue. Specific reference to additional federal, state, and local standards and regulations appears in this research in context only, but make the list extensive. However the dangers associated with technical rescue are also extensive. The challenge to any organization is adherence to the related standards and regulations while providing safe and effective technical rescue service.

Another challenge to an organization will be to conduct a thorough analysis which will focus on realistic technical rescue delivery. The author agrees with both IFSTA (1996) and Sargent (1999) when looking at technical rescue. IFSTA omitted wilderness search and rescue along with underwater search and rescue due to the fact these areas are beyond the range of most fire departments. Sargent stated that technician level building collapse service, or training, may not be necessary if an organization discovers, during a risk assessment, that only frame and masonry structures exist in its jurisdiction. In other words, the analysis should aid in determining what level of technical rescue should be implemented, or if the service already exists.

IFSTA's *Fire Service Rescue* and USFA's *Technical Rescue Technology Assessment* and *Technical Rescue Program Development Manual* are examples of valuable resources that can truly help an organization improve upon, as well as develop, technical rescue service. It is the intent of this author to utilize these very

resources to assist the Bismarck Fire Department with analyzing various portions of technical rescue.

The information obtained through this research will prove to be invaluable when the Bismarck Fire Department conducts its own formal technical rescue analysis. Considerable time will be saved just referencing the data contained in the literature review of this research.

In summary, special operations functions are built to fit a local jurisdiction, or region's needs. These needs are based upon geographic terrain, types of industrial and commercial activity, internal and external forces, risks, emergency response data, and budgetary support. Also, once implemented, a technical rescue service should contribute to the overall quality of life to both rescuer and victim.

RECOMMENDATIONS

The following recommendations are intended to help the Bismarck Fire Department, however other members of the fire service may find them beneficial when preparing to obtain data through an analysis.

1. This research has provided the ability to conduct internal and external analysis, including risk assessments, personnel training, and equipment availability. Implement a team of personnel to assist with the analysis. Utilize the analysis guide and other publications from this research and others as obtained. Enough personnel should be involved to adequately conduct a thorough analysis, yet not burden the overall process.

   Also, it may be beneficial to have personnel interested in being on a special operations unit participate in conducting the analysis. To do this, it may be

necessary to conduct further research regarding the entrance requirements, and selection criteria for assignment to a special operations unit. Having interested personnel conducting the analysis will increase personnel buy-in and ownership of the special operations unit, thereby assuring a greater chance of efficiency, and effectiveness.

2. Engage in further discussion, and review, with other local and regional fire departments and rescue services to determine existing technical rescue capabilities.

   Included would be the need to determine available equipment and personnel, including their current training levels, This information will prove extremely valuable once the actual type of technical rescue needs have been determined.

   Additionally, obtaining this information in conjunction with other analysis will enhance the overall special operations unit's strategic planning process.

   Additionally, during these discussions, combining resources, including training, may produce efficiencies that could further enhance both probability and success of a special operations unit.

   Finally, working with other agencies may produce a regional service that would even further enhance the possibilities of success and level of service provided through a special operations unit.

3. Conduct additional research pertaining to the projected expenses of a special operations unit, including initial start-up. Decision and policy makers of governing boards will need to be informed of any additional operating and

personnel costs associated with a special operations unit, regardless of need for the service.

Also, research would need to be conducted to find sources of training appropriate to the level of service, awareness, operations, or technician. Further research would also be necessary to determine what, if any, additional regional, state, local, and other laws, regulations, and standards affect the delivery of technical rescue service through a special operations unit.

Closure

The intent of these recommendations is to provide a means to obtain relative data prior to investing considerable resources, both human and material, into a major change. The use of analysis will give the leadership of any organization the ability to make clear decisions, based upon relative data, and ultimately plan the implementation and eventual institutionalization of the change, safely and effectively.

Additionally, it is further recommended that reviewing incidents, demographic changes, community growth, and associated needs, remains ongoing to assure that the proper type and level of service is provided.

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Appendices Not Included. Please visit the Learning Resource Center on the Web at http://www.lrc.fema.gov/ to learn how to obtain this report in its entirety through Interlibrary Loan.